



Abstracts for the 2018 NAEMSP Scientific Assembly

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OHCA at a single site from 10/2008–10/2016 were identified. Two CPR quality metrics, chest compression fraction (CCfr) and CC rate (CCra), were measured using accelerometer-based technology (E & X-Series), and compared between 3 groups: packaging (terminal 5 minutes on scene), loading (terminal 3 minutes on scene), and transport. Mechanical CPR was performed using AutoPulse® (ZOLL Medical), while most cases of manual CPR were performed with real-time audiovisual feedback (Real CPR Help®). Manual CPR [metronome rate of 100 beats per minutes (bpm)] and mechanical CPR (set CCra of 80 bpm) were compared by the median proportion of time in which CCra was within ± 5 bpm of the target range (pCCra) and the mean CCfr is reported using the Wilcoxon rank-sum test. **Results:** 357 cases were reviewed and 239 excluded: no age or age <18 years (6), medical or unknown location (31), non-cardiac etiology (87), data unavailable (115), leaving 118 included. No significant difference in CCfr was noted between the two groups during transport ($p = 0.47$). In cases with mechanical CPR, CCfr was higher during packaging 85.0 vs. 74.5 ($p = 0.0043$) and loading 86.0 vs. 72.2 ($p = 0.001$) than in cases with manual CPR. With mechanical CPR, CCra was more frequently within the target range during all study periods 0.4 versus 0.8 ($p = 0.001$), 0.3 vs. 1 ($p = 0.0021$), and 0.5 vs. 0.8 ($p = 0.0002$). **Conclusions:** In adults with OHCA, use of a mechanical CPR device was associated with higher CCfr during patient packaging and loading and a higher proportion of time within the target CCra rate during all time periods. Use of mechanical CPR may improve CPR quality without exposing providers to the risks of performing manual CPR during the packaging, loading, and transport of OHCA patients.

90. IS PREHOSPITAL EPINEPHRINE USED APPROPRIATELY IN PEDIATRIC ANAPHYLAXIS?

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Background: Anaphylaxis is an acute, life-threatening condition that requires immediate recognition and treatment. The goal of therapy should be early recognition and treatment with epinephrine to prevent progression to life-threatening respiratory compromise or cardiovascular collapse. More prehospital providers, parents, and school nurses, are being instructed in using epinephrine. We sought to determine how often epinephrine is used in children and, more importantly, how often it is administered correctly for anaphylaxis. **Methods:** Setting: A suburban two-tiered EMS system in which ALS units evaluate approximately 600 patients under age 13 per year. Patients: Children less than 13 years old over a 5-year period for whom ALS was dispatched for "Allergy/Anaphylaxis". Protocol: Demographics, history of present illness, vital signs, and interventions performed prior to EMS arrival and by EMS personnel were extracted using chart review. The percentage of patients with 95% confidence intervals ("CI") who were given epinephrine prior to EMS arrival, by EMS, and overall were calculated. Anaphylaxis was defined as acute cutaneous and/or mucosal involvement after antigen exposure plus one of the following: respiratory compromise, cardiovascular compromise, or persistent GI symptoms. Appropriate treatment was defined as epinephrine being administered when the patient's clinical syndrome met the definition of anaphylaxis, or being withheld when the clinical syndrome did not meet the definition. The percentage of patients who were treated appropriately was then calculated with CI. **Results:** Out of 2,750 ALS calls for

patients under 13 years old, 287 (10.4%) were for "Allergy/Anaphylaxis." The average age of patients was 6.5 years and 63% were male. 59% (CI: 54–65) of these patients received epinephrine - 49% (CI: 44–55) prior to EMS arrival, and 10% (CI: 6–13) by ALS personnel. The percent of patients who received appropriate treatment was 62% (CI: 56–66%). Of the inappropriate treatments, epinephrine was given inappropriately 30% (CI: 24–35%) of the time, and was withheld inappropriately 9% (CI: 5–12%) of the time. **Conclusions:** Despite increasing incidence and public awareness of life-threatening allergic reactions, both laypeople and prehospital providers struggle to diagnose and treat anaphylaxis in pediatric patients. More education is needed to recognize this disease process and treat it appropriately.

91. PEDIATRIC OUT-OF-HOSPITAL CARDIAC ARREST OUTCOMES BEFORE AND AFTER IMPLEMENTATION OF A STANDARDIZED RESUSCITATION TOOL

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Background: Pediatric out-of-hospital cardiac arrest (POHCA) occurs infrequently, yet requires the same urgency as for adults. Therefore, it is imperative that prehospital providers are prepared to rapidly treat POHCA. To meet this need, pediatric-specific tools have been developed. This study compares POHCA outcomes before and after implementation of an age-based resuscitation tool. **Methods:** Design: retrospective chart review. Setting: county-based ALS service with 87,000 calls per year, covering a population of 635,000 over 2,000 square miles. Subjects: patients <18 years old who sustained POHCA with resuscitation attempt without return of spontaneous circulation (ROSC) before EMS arrival between January 1, 2012 and December 31, 2016. On January 1, 2014, a commercial tool for POHCA, consisting of age-based medication dosing protocols, was implemented. Rates of ROSC, survival to hospital admission, and survival to hospital discharge were calculated and compared between the pre-implementation and post-implementation groups. **Results:** A total of 132 POHCA patients were identified, of whom 24 were excluded for having ROSC before EMS arrival. The remaining 108 patients had average age of 1.61 years, with similar baseline characteristics between groups. In the two years preceding the tool implementation (control group), there were 37 cardiac arrests. Of these, two had ROSC after EMS arrival and none survived to hospital admission. In the three years after implementation (experimental group), there were 71 cardiac arrests. Of these, 13 had ROSC after EMS arrival. All patients with ROSC survived to hospital admission and 3 survived to hospital discharge. Between the control and experimental groups, there was a 13% difference in ROSC after EMS arrival (5% vs. 18%; 95% CI: -0.01–0.24), 18% difference in hospital admission (0% vs. 18%; 95% CI: 0.06–0.29), and 4% difference in overall survival to discharge (0% vs. 4%; 95% CI: -0.06–0.12). **Conclusions:** After implementation of an age-based resuscitation tool, there was a statistically significant increase in POHCA survival to hospital admission. ROSC rate obtained after EMS arrival and survival to hospital discharge also increased, though failed statistical significance. Based on these results, EMS agencies may consider implementing an age-based resuscitation tool as part of a strategy to improve POHCA treatment.

92. COMPARISON OF COMMERCIAL TOURNIQUETS IN A PEDIATRIC TRAUMA PATIENT MODEL

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Background: Young children and adolescents are frequently injured in peacetime and wartime. Reviews of trauma registries at U.S. military medical facilities during the Iraq and Afghanistan conflicts show as the age of a child a child decreases the injury severity and mortality increases. Tourniquet use for control of extremity hemorrhage in adult trauma patients is associated with increased survival with only minimal tourniquet associated morbidity. Use of commercial tourniquets on pediatric patients treated at US military facilities shows survival benefits similar to those seen in the adult population. Hypothesis: We hypothesized that there would be differences in the efficacy of commercial tourniquets designed for adults when applied to pediatric patients of different ages. **Methods:** The institutional Ethics Review Board approved the study. The study was a prospective and non-blinded test of nine commercial tourniquets on a pediatric arm hemorrhage test model using six sized mannequins to simulate pediatric arms. The Stretch Wrap And Tuck (SWAT), TacMed K9 (TMK9), and Rapid Application Tourniquet System (RATS) tourniquets apply compressive forces by the elastic recoil action of the tourniquet strap. The Combat Application Tourniquet (CAT), Sam XT (SAMXT), Tactical Mechanical Tourniquet (TMT), and the SOF Tactical Tourniquet – Wide (SOFTTW) use a windlass to increase circumferential compression by decreasing strap length. The Child Ratcheting Medical Tourniquet (CRMT) uses a ratchet and ladder mechanism for circumferential compression. The Mechanical Advantage Tourniquet (MAT) has a turnkey apparatus mounted on a fixed length C-shaped housing that pulls a portion of the retaining strap into the housing as a mechanism to increase circumferential pressure. **Results:** The SWAT, TMK9 and RATS were successful stopping the flow of water on all sized mannequins. The CRMT was the only mechanical advantage tourniquet that was successful in stopping fluid flow on all mannequin sizes. The TMT and SOFTTW started failing on mannequins with 6.35 cm diameters. The CAT, SAMXT, TMT, and SOFTTW all failed on the 5.08 cm diameter mannequin. The MAT failed on the 7.62 and smaller diameter mannequin. **Conclusions:** We have shown that many commercially available tourniquets do not stop fluid flow in our pediatric arm hemorrhage test model.

93. PREHOSPITAL BLOOD PRESSURE MEASUREMENT IN MAJOR TRAUMATIC BRAIN INJURY: CONCORDANCE BETWEEN EMS PROVIDER DOCUMENTATION AND NON-INVASIVE MONITOR DATA TRACKING

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Background: Recent studies have shown that the lowest prehospital systolic blood pressure (SBP) is strongly associated with mortality across a remarkably wide range (far above 90 mmHg) in traumatic brain injury (TBI). Furthermore, in TBI research, case ascertainment and risk-adjustment are highly dependent upon documentation of prehospital BP. Objective: To identify the concordance between the lowest SBP documented by EMS personnel in patient care records (PCR) and the recorded non-invasive monitor data in TBI. **Methods:** A subset of major TBI cases (moderate/severe; CDC Barell Matrix 1) in the EPIC EMS TBI Study (NIH 1R01NS071049) were